

## Acknowledgments

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## **Appendix A: Manufacturers**

Campbell Scientific, Inc.  
815 West 1800 North  
Logan, UT 84321-1784  
(435) 753-2342 - tel  
(435) 750-9540 - fax  
[www.campbellsci.com](http://www.campbellsci.com)

Climatronics Corporation  
140 Wilbur Place  
Bohemia, NY 11716  
(631) 567-7300 - tel  
(631) 567-7585 - fax  
[www.climatronics.com](http://www.climatronics.com)

Radian International LLC  
5600 Airport Boulevard  
Boulder, CO 80301-2340  
(303) 443-2378 - tel  
(303) 443-1628 - fax  
[www.radian.com](http://www.radian.com)

R. M. Young Company  
2801 Aero Park Drive  
Traverse City, MI 49686  
(231) 946-3980 - tel  
(231) 946-4772 - fax  
[www.rmyoung.com](http://www.rmyoung.com)

Universal Manufacturing Company  
43900 Groesbeck Highway  
Clinton Township, MI 48036  
(810) 463-2560 - tel  
(810) 463-2964 - fax

Vaisala, Inc.  
100 Commerce Way  
Woburn, MA 01801-1068  
(781) 933-4500 - tel  
(781) 933-8029 - fax  
[www.vaisala.com](http://www.vaisala.com)

## Appendix B: Data Logger Program for Meteorological Towers

The following is the Campbell Scientific CR10 data logger program and associated comments for sensor cables and channels.

```
;{CR10X}
;CARB/CCOS, Written by Shane A. Beard, 04 MAY 00

;Analog Inputs:
;SE input 1, YELLOW, temperature (C)
;SE input 2, BLUE, relative humidity (%)
;SE input 3, CLEAR, wind direction (deg)

;Analog Grounds:
;AG, PURPLE, temperature

;Pulse Inputs:
;P1, CLEAR, wind speed

;Excitation Outputs:
;Ex1, RED, wind direction

;Control Ports:
;Ports 1 through 4 as needed for station address

;Power Connections:
;+12vdc, RED, temperature
;+12vdc, RED, wind speed
;+5vdc, ORANGE, temperature
;G, BLACK, wind speed
;G, BLACK, wind direction
;G, BLACK, temperature
;G, CLEAR, temperature
;G, SHIELD, wind speed
;G, SHIELD, wind direction

;Station Address Information:
;STN#1 CAR Carrizo Plain
;STN#2 PBL Piedras Blancas
;STN#3 MKT McKittrick
;STN#4 KET Kettleman City
;STN#5 GRN Granite Bay
;STN#6 SUI Suisun City
;STN#7 REY Point Reyes
;STN#8 SHA Shasta Lake
;STN#9 BEL Bella Vista

;Data Output Table:
;Record #
;Station #
;Year (YYYY)
;Julian Day (DDD)
;Time (HHMM)
;2-m temperature (C)
;2-m relative humidity (%)
;10-m scalar average wind speed (m/s)
```

```
;10-m vector average wind speed (m/s)
;10-m vector average wind direction (deg)
;10-m standard deviation of wind direction (deg)
;battery voltage
```

\*Table 1 Program

```
01: 1      Execution Interval (seconds)

1:  Volt (SE) (P1)
  1: 1      Repts
  2: 5      2500 mV Slow Range
  3: 1      SE Channel
  4: 1      Loc [ temp_in_C ]
  5: .1     Mult
  6: -40    Offset

2:  Volt (SE) (P1)
  1: 1      Repts
  2: 5      2500 mV Slow Range
  3: 2      SE Channel
  4: 2      Loc [ RH_pct ]
  5: .1     Mult
  6: .0     Offset

3:  Pulse (P3)
  1: 1      Repts
  2: 1      Pulse Channel 1
  3: 3      High Frequency, 16 Bit, All Counts
  4: 3      Loc [ windspeed ]
  5: .04287 Mult
  6: .22    Offset

4:  Excite-Delay (SE) (P4)
  1: 1      Repts
  2: 15     2500 mV Fast Range
  3: 3      SE Channel
  4: 1      Excite all reps w/Exchan 1
  5: 1      Delay (units 0.01 sec)
  6: 2500   mV Excitation
  7: 4      Loc [ dir_deg ]
  8: .142   Mult
  9: .0     Offset

5:  Batt Voltage (P10)
  1: 5      Loc [ battvolt ]

6:  Read Ports (P25)
  1: 15     Mask (0..255)
  2: 6      Loc [ stn_numbr ]

7:  If time is (P92)
  1: 0      Minutes (Seconds --) into a
  2: 5      Interval (same units as above)
  3: 10     Set Output Flag High (Flag 0)
```

```

8:   Sample (P70)
    1: 1      Reps
    2: 6      Loc [ stn_numbr ]

9:   Real Time (P77)
    1: 1220   Year,Day,Hour/Minute (midnight = 2400)

10:  Average (P71)
    1:2      Reps
    2:1      Loc [ temp_in_C ]

11:  Wind Vector (P69)
    1: 1      Reps
    2: 0      Samples per Sub-Intervals
    3: 02     S, U,  $\theta_1$ ,  $\sigma(\theta_1)$  Polar
    4: 3      Wind Speed/East Loc [ windspeed ]
    5: 4      Wind Direction/North Loc [ dir_deg ]

12:  Sample (P70)
    1: 1      Reps
    2: 5      Loc [ battvolt ]

*Table 2 Program
    01: 0      Execution Interval (seconds)

*Table 3 Subroutines

End Program

```